National EPA-Tribal Science Council (TSC)
Fall 2020 Virtual Science Meeting

December 1–4, 2020

FINAL MEETING SUMMARY

Tuesday, December 1, 2020
Theme: Beneficial, Effective and Culturally Sensitive Communication

Gathering and Opening

José Zambrana, Outgoing TSC Agency Co-Chair, Center for Environmental Measurement and Modeling (CEMM), Office of Research and Development (ORD), U.S. Environmental Protection Agency (EPA), and Neil Patterson, Jr., TSC Tribal Co-Chair, Tuscarora Nation

José Zambrana and Neil Patterson welcomed the participants to the virtual meeting. José thanked the TSC for such a rewarding experience in serving as the TSC Agency Co-Chair. Neil thanked José for his service as Co-Chair and provided the opening blessing in the Tuscarora language.

TSC Agency Co-Chair Passing of the Baton

Kacee Deener, Deputy Director, Office of Science Advisor, Policy and Engagement, ORD, EPA

Kacee Deener explained that ORD selects the TSC Agency Co-Chair, who serves a 2-year term, through a nomination process. Brenda Rashleigh currently serves as the Assistant Center Director for Water in ORD's Center for Public Health and Environmental Assessment in Narragansett, Rhode Island. Her expertise is in aquatic resources, nutrients and harmful algal blooms (HABs). Kacee thanked José for his leadership during his term, which was extended to 3 years because of the ORD reorganization, and noted that his strong working relationship with Neil highlights the collaborative spirit on which the TSC was founded.

Brenda accepted the "baton" and thanked José for his leadership of the TSC. Brenda is excited for the opportunity to serve as the TSC Agency Co-Chair and thanked the Agenda Development Team for developing a quality meeting agenda.

Mutually Beneficial Discussions

Neil Patterson, Jr., TSC Tribal Co-Chair, Tuscarora Nation, and Brenda Rashleigh, Incoming TSC Agency Co-Chair, ORD, EPA

Neil provided background on the importance of engaging in consultation with tribal governments and highlighted EPA's policy on tribal consultation. Virtual consultation has been a topic of conversation since the COVID-19 pandemic began. In April, EPA developed a memorandum and guidelines on carrying out the *EPA Policy for the Administration of Environmental Programs on Indian Reservations* (1984 Indian Policy) while engaging in virtual consultation. In May, the *High Country News* published an article focusing on federal consultation and decision-making about cultural resources, the environment and public health. To build relationships between Indigenous peoples and government agencies, it is important to be aware of cultural differences, be grateful for the chance to meet, exhibit humility and awareness, respect and acknowledge the history that created the current situation, understand and state one's intentions around the current effort, engage around what is needed, and show up again and again.

Brenda covered best virtual meeting practices, such as remaining on mute when not speaking and using the webinar technology to virtually raise a hand to speak.

Coffee and Check-In With the TSC Tribes

The TSC Tribal Representatives shared brief updates about their tribes and tribal activities.

Shasta Gaughen, Pala Band of Mission Indians, explained that the warm temperatures she is experiencing in San Diego are not normal and stressed the need to examine the climate science about how climate patterns are changing and how weather is linked to these larger patterns. It also is important to decolonize science. Her tribal colleagues continually note that tribes are resilient, have dealt with climate issues for millennia, and encourage scientists to integrate traditional ecological knowledge (TEK) into their research.

Page Hingst agreed with Shasta's thoughts on climate. No snow is on the ground of the Santee Sioux Nation of Nebraska, but there should be. Her tribe has carried on business as usual with increased precautions throughout the pandemic, instituting checkpoints throughout the reservation and in the village of Santee. COVID-19 cases have been low in the community, with one death. Page works on issues related to Brownfields and solid waste, and her program has performed public outreach and cleaned up seven more dump sites, resulting in the proper disposal of 404 tons of solid waste; eight dump sites remain. Her next project is to film 1-minute public outreach videos to post on Facebook.

Craig Kreman explained that he had just provided TSC updates at the Region 6 Regional Tribal Operations Committee (RTOC) meeting, which is happening concurrently. His work is related to the Tar Creek Superfund site and its associated remedial activities. The Quapaw Nation uses TEK and air, land and water research to determine impacts to the tribe from an environmental justice position. After receiving permission from EPA 8 years ago, the tribe has been successful in removing mining chat from the site. The Quapaw Nation is the first tribe to perform this type of remediation.

Katie Tiger reported that things are beginning to return to normal. The Eastern Band of Cherokee Indians had shut down from April until June and then initiated a "soft" closing in October. The tribe recently reopened and encouraged employees to work from home. Katie thanked José for his leadership and noted that Neil and José make a great team. The TSC has accomplished a great deal under their leadership.

Billy Longfellow, Passamaquoddy at Sipayik, explained that his tribe has been shut down throughout the pandemic. Visitors are stopped at the gate, with only community members and those performing essential services allowed on the reservation. Everyone entering tribal lands must have a negative COVID-19 test less than 7 days old. With the tribal government partially shut down, Billy must prioritize his most essential tasks.

Jasmine Courville-Brown introduced herself to the TSC and other invited guests and explained that she was attending the meeting to represent the Tribal Pesticide Program Council (TPPC). She attended a TSC meeting a few years ago and had appreciated hearing about the cutting-edge cultural and science work happening in Indian country. The TPPC has been working on a report about the status of pesticides in Indian Country and is determining whether the adverse effects of PFAS and methylene chloride can be mitigated in Indian Country. Many tribes are working collaboratively toward the same end goals.

Effective and Culturally Sensitive Virtual Consultation During the Pandemic
Andy Byrne, Senior Advisor, American Indian Environmental Office (AIEO), Office of International and Tribal Affairs (OITA), EPA

Andy Byrne explained that EPA's consultation portfolio falls under AIEO. Karen Gude—who served on the TSC as the Office of Water (OW) representative and was OW's Tribal Program Liaison—is on temporary detail to AIEO and manages this consultation portfolio. OITA does not put forth the rules, standards or decisions subject to consultation, instead serving as the primary office that ensures EPA is meeting the requisites of its tribal consultation policies. Tribal consultation is one of the most important priorities and responsibilities of AIEO, and passionate feedback from tribes indicates that it is extremely important to them too. Andy invited the TSC to provide feedback to AIEO about virtual consultation.

AIEO's role in consultation is to create clear and concise expectations for all other EPA offices, remind other offices of EPA's consultation policy, create tools to ensure that tribes are notified and aware of

consultation opportunities, and solicit feedback from tribes and EPA offices to modify existing protocols as needed.

OITA focused on two areas as it worked to make consultation effective during the pandemic: (1) working across EPA to provide updated guidance to all offices and regions on considerations for moving forward on actions during the pandemic that may have tribal implications or be subject to the EPA consultation policy and (2) continuing to learn how to improve the consultation process during this unprecedented situation and soliciting feedback from partners and tribes to make virtual consultation more effective. OITA is working with program offices on best practices that they can use when performing consultation. At the beginning of the pandemic, OITA obtained feedback from tribes and EPA staff and senior management on how to best modify its consultation processes in response to the pandemic and developed guidelines on how to perform virtual consultation for the duration of the COVID-19 public health emergency. EPA recognizes that tribes have enacted different COVID-19 staff policies, and these will not diminish EPA's responsibility to perform consultation. Tribes will continue to be included in meaningful consultation. Consultation periods will be extended when possible, although some of EPA's regulatory responsibilities do not always allow for this, and some decisions cannot be paused.

During the past 8 months, EPA has been learning through trial and error what works best for virtual consultation. Some lessons learned include assigning a logistical lead on the tribal and EPA sides before beginning consultation, considering tribal preference and access when selecting a virtual platform, clearly stating in advance the agenda and the specific action on which EPA is seeking consultation, clarifying prior to the consultation the best way for tribes to provide meaningful informed input, and being prepared technologically for the consultation meeting.

Shasta commented that the best practices for tribal consultation should not be a surprise, whether in the middle of a pandemic or not. She noted that including numerous tribes on a single, short consultation call does not qualify as true government-to-government consultation; this gives the impression that an agency is just "checking a box." Andy responded that he has heard the "check-the-box" comment frequently, and AIEO is addressing this. Shasta recommended providing funding for tribal activities related to consultation. For example, EPA could build capacity in General Assistance Program funds to allow program staff to prepare tribal officials for consultation.

Suzanne Fluharty commented that two items make tribal consultation meaningful. First, consultation must be more than just a notification. Some offices, such as the Office of Chemical Safety and Pollution Prevention (OCSPP), schedule a meeting before the consultation to help tribes understand the issue. This allows tribes to discuss the matter internally and prepare for the consultation meeting. This model should be used more often. Second, EPA must consider cultural effects that its actions may have on tribes. Amanda Hauff added that OCSPP provides a technical briefing and then allows ample time for comments within the consultation period, and OCSPP staff are available for one-on-one briefings at tribal request.

ORD Remarks
Bruce Rodan, Associate Director for Science, ORD, EPA

Bruce Rodan welcomed Brenda as the new TSC Agency Co-Chair and thanked the TSC for the opportunity to participate in the meeting because meetings are important for the exchange of knowledge. He noted that tribes are disproportionally affected by COVID-19. Staying home as a result of the pandemic, he and his wife have been able to see the positive, such as watching the seasons change and observing the cycle of life.

Bruce explained that EPA's Chapel Hill laboratory has worked with the University of North Carolina at Chapel Hill on applied COVID-19 research on face coverings and masks. Beginning in mid-2021, ORD will begin to plan the Strategic Research and Actions Plans (StRAPs) for the next cycle from 2023 to 2026. He thanked the TSC for the members' input on the current StRAPs, on which EPA's six National

Program Directors (NPDs) will provide updates during this meeting. ORD is grateful for the feedback from the EPA-Tribal Partnership Groups and will focus on tribal consultation moving forward with the next StRAP cycle.

Bruce concluded his remarks by noting that the following day marks the 50th anniversary of EPA. EPA could not have achieved its many accomplishments without its partners. TSC is valued partner of ORD, and Bruce congratulated the TSC on its longevity as the Council celebrates its 19th anniversary this month.

Keynote Presentation: Culturally Appropriate Protocols in Tribal Historic Preservation
Michael (Mike) Durglo, Jr., Interim Tribal Historic Preservation Officer (THPO), Confederated Salish and Kootenai Tribes of the Flathead Reservation (CSKT)

Shasta, who serves as the THPO for the Pala Band of Mission Indians, provided background about why the TSC Tribal Representatives considered this an important topic to highlight. To tribes, cultural and environmental issues are inextricably intertwined: Land is culture, and water is life.

Mike Durglo thanked the TSC for inviting him; he appreciates the opportunity to say hello to his old TSC friends. He has worked for his tribe for 38 years in many capacities, including serving as the Environmental Director in the Natural Resources Department and Tribal Historic Preservation Department Head. It was personally moving when he became the Tribal Historic Preservation Department Head and moved into his new office because it was his dad's old job and his dad's old office. He emphatically agreed with Shasta that cultural resources and natural resources are one and the same.

Mike received a Bureau of Indian Affairs climate resiliency grant for the tribe when he was in the Natural Resources Department, and when he moved, he had to submit a request to the CSKT Tribal Council that the grant be moved to the Tribal Historic Preservation Department. He was asked why he was still working on climate change in his new position, and Mike wondered why anyone in cultural preservation would not be working on climate change and resilience. Environmental staff and THPOs protect the same resources.

Knowing that ancestors walked and are buried on tribal lands is powerful and humbling. During his first week in the Tribal Historic Preservation Department, Mike met with the U.S. Army Corps of Engineers (USACE) and U.S. Forest Service (USFS) regarding 25,000 artifacts currently being stored at Salish Kootenai College. These artifacts, which had lain in place for thousands of years, were unearthed in the middle of the 20th century as the result of the construction of Libby Dam on Lake Koocanusa. The area includes more than 300 cultural resources sites, including gravesites, campsites and lithic scatters. Mike's goal was to develop a de-accessioning plan to return the artifacts to the rightful owners—the Kootenai people. USACE maintains that these artifacts belong to the U.S. government in perpetuity.

The Kootenai people believe that these and all artifacts should remain in their original locations where the ancestors placed them and advocate for filling versus digging so as not to disturb these artifacts. When USFS decided to build a parking turnout at Roger's Pass near a historic lithic scatter on ancient Kootenai bison-hunting grounds, CSKT worked with the agency. Instead of excavating 10 feet into the mountain, USFS agreed to fill from the bottom.

Agencies must understand the importance of cultural resources, and some agencies are more successful at this than others. CSKT provides half-day cultural sensitivity training to agencies; CSKT elders participate in the training, which is intended to help federal employees better understand tribal perspectives. For example, an entire mountain is sacred to CSKT, not just the natural and cultural resources associated with the mountain. The spirit of the Kootenai ancestors remains present in the artifacts at these historic sites. These sacred objects belong to all tribal members. Mike is advocating for tribes—not federal agencies—to be allowed to determine their own items of Native American cultural patrimony that should be repatriated.

CSKT is updating and rewriting its climate strategy, originally developed in 2012, because the science indicates that change is occurring at a much faster rate than the models had indicated when the strategy was written. An important component is connectivity—the connection of the people with the land. The climate strategy is available at csktribes.org/CSKTClimatePlan.pdf.

Shasta noted that the Quapaw Nation THPO, Everett Bandy, was in attendance. Everett explained that the Quapaw Nation has a Superfund site that extends into more than one EPA region, and the tribe needed to work with both regions. A categorical exclusion under the National Environmental Policy Act (NEPA) applies to certain situations, such as Superfund, but does not apply in any way to the National Historic Preservation Act (NHPA) of 1966. Some federal agencies do not understand this distinction. The Quapaw Nation, and many other tribes, have had to deal with the issue that NHPA still applies to sites categorically excluded under NEPA. Craig added that the tribe was able to ensure that a cultural preservation officer was present at all times during the Superfund site remediation because of nearby gravesites and other cultural sites (Catholic 40 Mission Site). Tribal lifeways and subsistence living also were considered during the cleanup.

Shasta commented that all items of cultural significance—trees, wildlife, wild rice, mountains, the landscape and so forth—are tribal members' relatives. Consultation is not just about the impacts on a habitat but also about the impacts on the people and their lifeways.

Recap and Closing

Brenda and Neil provided a short recap of the day's discussions, and Neil noted that the presence of so many THPOs at a TSC meeting is unprecedented. A Haudenosaunee tradition is to bank up the embers at the end of the day to reignite them when the meeting reopens the following day. Neil closed for the day in the Tuscarora language and recessed the meeting at 5:13 p.m.

Wednesday, December 2, 2020
Theme: Justice and Science Issues

Gather, Day 1 Recap and Guest Introductions

Neil opened the meaning in the Tuscarora language, and Neil and Brenda provided a recap of the previous day's discussion.

Equity, Justice and Science
Neil Patterson, Jr., TSC Tribal Co-Chair, Tuscarora Nation, and Shasta Gaughen, Pala Band of Mission Indians

Neil thanked the TSC for recognizing the importance of the topic of equity and justice, particularly in terms of science. It has been 2 years since he presented about Indigenous research methods at the TSC Fall 2018 Face-to-Face Meeting in Gulf Breeze, Florida, which covered suggestions for how to begin to decolonize research.

The monthly TSC Science Seminars have highlighted a number of Indigenous researchers, such as Bradley Moggridge from Australia, who presented on Indigenous cultural values and knowledge of water. The aboriginal views of the water's relationship within the larger world and water-dependent cultural values resonated with Neil as a member of Turtle Island in Haudenosaunee country. Max Liboiron of Canada presented on the Civic Laboratory for Environmental Action Research's guidelines for research with Indigenous peoples (civiclaboratory.nl/2016/09/28/guidelines-for-research-with-indigenous-peoples). Dominique David-Chavez presented on Indigenous research frameworks, Indigenous data sovereignty, and the FAIR and CARE concepts: Data should be ***F***indable, ***A***ccessible, ***I***nteroperable and ***R***eusable, and researchers should consider the ***C***ollective benefit, ***A***uthority to control the data, ***R***esponsibility and ***E***thics. The U.S. Indigenous Data Sovereignty Network is working to address the

imbalance of research in Indigenous communities and is challenging scientific researchers to look beyond FAIR and consider CARE and the benefit to community.

Shasta had previously considered what the concepts of justice, equity, diversity and inclusion mean for tribes. To effectively address these concepts, collectively known as JEDI, it is important to center Indigenous knowledge in addition to decentering Western colonial frameworks. American history neglects telling the true Native American stories, and stereotypes affect law, policy and decision-making. Historical trauma must be acknowledged, and modern trauma still occurs as well. Recognizing systemic inequality and understanding and respecting tribal sovereignty are necessary. Successfully implementing JEDI does not mean simply inviting tribes to sit at the colonizers' table—all of the above points also must be considered.

Shasta reminded participants about the important reasons to develop Indigenous research methodologies, which are the basis for the afternoon's breakout sessions:

- *Protect* tribal knowledge.
- *Center* tribal research priorities.
- *Assert* tribal sovereignty.
- *Control* access to tribal data.
- *Benefit* tribal communities.
- *Support* ethical research in tribal communities.

Suzanne noted the lack of funding for topics of tribal interest. She also advocates for criteria within environmental regulations that are protective of tribal members and their cultural and subsistence activities. Developing criteria only for recreational activities and the general population is not enough.

Alexa Olson shared her previous research experience, in which the research was performed for the sake of research rather than having a defined, specific beneficial outcome. It is interesting to think about how to change the focus of research to better correlate with benefit.

Lon Kissinger pointed out the work that Pacific Northwest and Alaska tribes have done to characterize their fish consumption practices, which, in turn, has led to environmental regulations that protect tribes through more relevant water quality standards and risk assessment practices. Tribes can perform research that influences environmental regulations and instituting environmental regulations across the United States that are protective for Native Americans is important.

Keynote Presentation: The Klamath River and the Rights of Nature
Geneva E.B. Thompson, Associate General Counsel, Office of the Tribal Attorney, Yurok Tribe and Citizen of the Cherokee Nation

Geneva Thompson explained that the information she shared is for informational and educational purposes only. The Rights of Nature Legal Framework is a legal and jurisprudential theory that describes the inherent rights associated with ecosystems and species in a manner similar to the concept of fundamental human rights. This concept challenges 20th-century laws as generally grounded in a flawed view of nature as a resource to be owned, used and degraded. The framework promotes system-based science to develop laws and regulations, as well as promotes the understanding that humans and the natural world are fundamentally interconnected. Indigenous communities have been practicing this framework and world view since time immemorial.

The cultural or customary laws of many tribes acknowledge nature's inherent rights, but most tribes have not codified these laws, and they exist as a common understanding among tribal members. Diné Fundamental Law, Title 1 of the Navajo Nation Code, Section 5, codifies Mother Nature's inherent right to help with the Navajo Nation's ability to enforce and protect nature's own laws and right to exist.

One category under nature law is the rights of animals. Domestic animals have the right to be treated humanely and not abused. Wild animals have rights to life, liberty and procreation in their natural environment. United Nations Educational, Scientific and Cultural Organization (commonly known as UNESCO) established the Universal Declaration of Animal Rights in 1978. Another category is the rights of species, and specific species have inherent and or codified rights. The 1855 Treaty Authority Resolution of the Chippewa Indians establishes the rights of *manoomin* (wild rice), which has the inherent right to exist, flourish, recover, regenerate and evolve, and be restored and preserved. Chippewa tribes and bands have the right to harvest wild rice, and outside entities are prohibited from harming this species. The 1855 Treaty Authority allows these tribes and bands to enforce and defend this law. An example of a species serving as plaintiff is the case of *Palila v. Hawaii Department of Land and Natural Resources*, which alleged that the state violated the Endangered Species Act.

Another category is the rights of ecosystems, which have inherent and/or codified rights. New Zealand's Whanganui River is a recognized legal entity. The Whanganui River Agreement, and its associated legislation, creates a new legal entity that represents the river and its interests; the river is no longer owned by humans. The agreement was negotiated between the Māori people and British Crown and passed by the New Zealand parliament.

U.S.-based Native regulatory and civil jurisdiction is a hotly contested and difficult area in which to navigate. Native nations have the inherent authority to regulate their lands and people within their lands based on their sovereignty and authority to exclude. The United States recognizes Native nations' authority to regulate members of the nation, nonmembers on tribal lands and nonmembers on fee land within reservation boundaries in specific situations. The inherent authority to regulate nonmembers is the most challenging aspect. The United States does not recognize Native nations' authority to regulate the action of nonmembers on fee lands unless at least one of four specific exceptions apply. Depending on how regulations are drafted, however, the rights of nature laws can apply to most, if not all, of these exceptions.

Geneva described the Yurok world view on protecting Yurok natural resources, highlighting a quote from the Yurok Constitution Preamble. The whole land must be maintained in balance, and the Yurok must keep the land that way by their good stewardship. Keeping Yurok land in balance is the basis for writing and enforcing Yurok laws. The Klamath River is a significant landscape and ecosystem for the Yurok people and has been since time immemorial. The Yurok people's culture, family, religion, fishing practices and economic status are inextricably intertwined with the river.

Resolution 19-40, the Rights of the Klamath River, was adopted by the Yurok Tribal Council on May 9, 2019. Protecting the Klamath River is at the core of the Yurok Tribe's sacred responsibility to the Yurok people and is essential to their survival. The resolution recognizes the rights of the Klamath River, and the Office of the Tribal Attorney was directed to draft an ordinance detailing the mechanics of the law. This is not a new law—it is now being codified in a Western manner. The Office of the Tribal Attorney currently is drafting a new ordinance to establish the Yurok legal framework for codifying the rights of the river. Specific tasks include legal and departmental review, stakeholder meetings, Yurok Tribal Council review, and establishment of environmental and cultural enforcement infrastructure.

The ordinance includes a very inclusive, robust definition of the terms "*We-roy*" and "cultural riverscape." The Yurok term *We-roy* is synonymous with the term "Klamath River," and both terms mean the Klamath River and its ecosystem, as well as the species within, connected to and/or dependent on the ecosystem. This ecosystem includes the entire Klamath River basin, from the headwaters in Oregon, sacred high country, the river's contributing tributaries and underground aquifers, and through and past the estuary into the Pacific Ocean. Similar to a cultural landscape, a cultural riverscape is a river and its environs—including cultural and natural resources and the wildlife or domestic species therein—associated with a historic event, activity or person or exhibiting other cultural or aesthetic values. Cultural

riverscapes are associated with significant patterns of events in traditional histories and the groups of people who have built their cultural lives around a river and its fish, plants, wildlife and water.

The goals of the Yurok ordinance are to exercise the inherent sovereignty of the Yurok Tribe to protect the health and well-being of the Klamath River, exercise the Yurok Tribal Court's adjudicatory authority over any person who enters the reservation, utilize state and federal laws to increase protection of the Klamath River, collaborate with partners on co-management of the river and its resources, protect sensitive and confidential cultural information from public disclosure, utilize the law to support advocacy efforts, and engage in restoration projects and education. The Klamath River law includes the following sets of rights: natural, cultural, restoration, property and legal.

Shasta asked whether the trusteeship includes the portions of the river on the reservation or the full river. Geneva answered that the goal is to protect and advocate for the full river in partnership with other tribes in the basin, but the tribe still is engaged in the process of determining how to advocate for the river in the best way possible. Shasta asked whether the tribe has encountered opposition. Geneva responded that most feedback has been positive, and people are excited about the idea. Some tribal members thought that the government did not have the right to formally give the river rights because the river always has had rights. The effort now is being framed as the tribe formally putting these inherent rights into writing in a modern iteration.

Beth Jackson appreciated the Yurok Tribe sharing its work on how to protect natural resources. Geneva noted that this is a growing movement, and many tribes are grappling with the notion of how to draft these types of laws. She would love to connect with other tribes to share information and ideas on how these types of laws can be better drafted and realized.

Dianne Barton commented that the Yurok Tribe could use its new treatment-as-state status to develop water quality standards to protect the river. Geneva agreed that this is another tool to advocate for and protect the Klamath River. There is a clear connection between this status and the ordinance.

José asked whether regulating nonmembers will help to decrease pollution upstream. Geneva responded that upriver actions will determine what ordinance actions can be taken or whether state and local partners will be needed. The goal is to ensure that the law will be flexible enough to address the large variety of situations that may be encountered. Through advisories, education and enforcement, the Yurok Tribe will be able to provide justice for the river.

Karen Hamernik thanked the Yurok Tribe for its efforts to advocate for the river. She asked whether Geneva thought that this type of law might have prevented or facilitated faster cleanup of the Gold King Mine spill into the Animas River. Geneva hoped that a law like this would help with that type of situation. State and federal partners must to understand fully the cultural significance of the river, help with the environmental review process, and enact extra preemptive and mitigation measures to protect cultural resources. If a spill occurs, the affected tribe must have jurisdiction to enforce environmental and rights-of-nature laws to ensure the river can be made whole and restored to its precontamination state. Laws should promote justice and be flexible enough to cover the specifics of any future situation.

Suzanne noted that the Yurok Tribe has considered these types of situations so that the tribe would be able to determine the damage and the necessary level of cleanup without waiting for EPA risk assessments, which often do not include tribal lifeways.

Breakout Sessions

The TSC members and invited guests met in smaller breakout groups led by TSC Tribal Representatives to discuss justice and science issues in preassigned small groups. Each group developed principles and best practices related to the following topics mentioned above:

- *Protect* tribal knowledge.
- *Center* tribal research priorities.
- *Assert* tribal sovereignty.
- *Control* access to tribal data.
- *Benefit* tribal communities.
- *Support* ethical research in tribal communities.

Breakout Group Report Outs

Shasta reported out for the Protect Tribal Knowledge Breakout Group, which had a robust discussion about having the discipline to do things the right way (e.g., discipline to listen, to put away individual ways of speaking, to be respectful of how tribes present knowledge). EPA must ask why it wants tribal knowledge, respect tribes and build trust with tribes, which helps tribes to understand that their knowledge can be protected. Tribal information should not have to be included in public databases if the tribe does not want it to be included; there are methods to collect knowledge that can still be protective and not subject to the Freedom of Information Act (FOIA). External groups must acknowledge tribal concepts and ways of knowing (e.g., Indigenous food ways) and that tribes are the experts of their own knowledge.

Craig commented that the Control Access to Tribal Data Breakout Group also discussed trust and ways to obtain knowledge that can be protective. No one-size-fits-all solution exists. Also, EPA must have the willingness to learn. Lon added the group had discussed areas in which tribal data frequently are considered by EPA, including unique resources and resource locations (e.g., medicinal plants, harvest areas, TEK, tribal biomedical information). Tribes should not provide data to EPA that they do not want subject to FOIA and should have data use agreements in effect that detail exactly how data can be used, how data will be returned to the tribe, and how data should be destroyed after external analysis. EPA must be proactive in making tribes aware of who is requesting data, how data will be used, and potential vulnerabilities of releasing information. The TSC could have a role in developing resources and information to make tribes aware of concerns around data use, as well as the limitations of the federal government to protect data. Tribes ideally would be open about their data needs so that EPA can develop coordinated responses to benefit the maximum number of tribes (e.g., HAB management).

Chris Taylor reported that the Center Tribal Research Priorities Breakout Group discussed the importance of researchers' working with and for tribes as opposed to simply answering questions the researcher has developed based upon their Western-based scientific framework. The group also discussed obstacles that need to be overcome in order to engage in this paradigm shift. For example, staff members spend most of their time working with States, communities, and industry regarding laws, regulations, statutes and policies that were developed around this Western framework; any associated research funding and related functions thus also flow from this framework. Because these staff do not work consistently with tribes and do not understand their "non-Western" beliefs/practices, they attempt to simply force what they know onto them. To correct this, EPA must change their methods and consider how to bring a more tribal-centered perspective into this research. To be effective, EPA needs to find a way to bring centered research into both long-term research questions and short-term applied research questions. Tribal frameworks must be included in the conversation as early as possible. EPA should not think of this as pre-engagement; staff at all levels must engage continuously with tribes throughout the research process, which will allow EPA to connect with tribes at a deeper level and understand their specific science needs, rather than simply asking generic scientific questions. For example, recent wildfire research adopted translational research approaches for tribes, an approach that should be adopted more widely.

José reported that the themes of the Assert Tribal Sovereignty Breakout Group touched on other themes from the day's discussions. The group generated example guidelines for EPA researchers working with tribes:

- Work must benefit the tribe, as defined by the tribe.
- Tribes can assert sovereignty over what research is done, by whom and what is done with the generated data.
- Permission must be obtained from tribes—there is no free pass.
- All data and information must be provided to the tribe.
- EPA should defer to tribal sovereignty and protocols, and tribes have the right to determine protocols on a case-by-case basis and decline if they prefer. Special care should be given when seeking to work with smaller tribes.

Alexa reported out for the Benefit Tribal Communities Breakout Group, which thought that establishing strong partnerships when identifying research ideas is important so that the projects have the most beneficial outcomes, as is identifying each partner's strengths and developing timelines that include plans to communicate with tribes. Researchers also should document data usability timelines and detail how the data will be used. Data should be used only as authorized for the project. Communication with the community must occur from the very beginning and throughout the research process. Establishing a point of contact for the community also is important. Research could help to build capacity within the community and not just with the environmental department, potentially through citizen science.

Regina Poeske explained that the Support Ethical Research in Tribal Communities Breakout Group took a philosophical approach to its discussion. The best science comes from a collaborative approach, and EPA must consider ethics in a meaningful way when performing research. The best collaborative research approach with tribes involves mutual respect, trust, relationships and a true collaboration from the beginning (i.e., research with tribes and not to tribes). Research is ceremony: Researchers must recognize the human factor. EPA is discussing best practices for collaboration research (e.g., translational research), but the true spirit must be included, and EPA cannot just check the boxes.

Shasta commented that Amanda had explained that the development of the tribal children's lead curriculum was tribally driven with an EPA-partnered approach. Shasta gave the analogy of tribes driving the race car, with EPA serving as the pit crew. Neil would like the TSC to take action on the items identified during these breakout sessions to develop momentum within EPA. He described his initial work with EPA in 1996 as a result of EPA's environmental justice university–community partnership grants. A local university applied for and received one of the EPA grants without involving the tribe in the application process. The Tuscarora Nation found out that it was included in the grant after it was awarded and could not understand why the tribe had not been included earlier. Eventually, EPA realized that it must obtain tribal community input before awarding grants to a "partner" university.

Neil "banked up the embers" and recessed the meeting at 5:26 p.m.

Thursday, December 3, 2020
Theme: Tools and Resources for Tribes

Gather, Day 2 Recap and Guest Introductions

Neil opened the meeting in the Tuscarora language, and Neil and Brenda provided a recap of the previous day's discussion.

Updates From ORD's National Research Programs

Air and Energy

Bryan Hubbell explained that the Air and Energy Research program is working with tribal partners on indoor air exposures during smoke events. The Hoopa Valley Tribe regularly experiences high concentrations of smoke from wintertime woodstoves and summertime wildfires. The tribe is concerned about summer and fall air quality because of wildfires and winter air quality because of woodsmoke and inversions. The ASPIRE (Advancing Science Partnerships for Indoor Reductions of Smoke Exposures) Study includes three different study components: air monitoring in Missoula, Montana, and Hoopa, California; evaluating portable air cleaners through laboratory studies; and sponsoring a challenge competition in 2021 to find low-cost approaches for cleaner indoor air during wildfires.

To measure indoor and outdoor air quality, the researchers began with questions about how effective air filtration systems are during smoke events, indoor and outdoor concentrations of fine particles, and how filtration effectiveness varies under different conditions. The approach relies heavily on year-round monitoring with PurpleAir sensors to understand real-world variation under typical conditions and when smoke events occur. The focus is on public and commercial buildings used by larger numbers of people during fire season. The Hoopa Valley Tribe and EPA share the workload, with the tribe determining the monitoring locations, installing and maintaining the sensors, downloading and reporting sensor data, performing quality assurance, and mapping smoke concentrations. EPA provides project planning and oversight, sensor network management, a mobile monitoring system, a contractor for monitoring support, and data analysis. Preliminary results indicate that indoor fine particles are driven by outdoor concentrations, and indoor concentrations lag behind outdoor concentrations. Wintertime woodsmoke typically peaks at midnight, whereas wildfire smoke typically peaks at midday. A HEPA filter installed in a community building reduced indoor fine particle concentrations, even during elevated outdoor concentrations. Plans for 2021 include conducting evaluations of the HVAC systems in each building to better understand the factors that affect indoor air quality, taking additional sensor measurements (e.g., volatile organic compounds, carbon monoxide), and developing useful outreach materials.

Other smoke research the program is conducting includes supporting development of new ways to monitor wildfire emissions, assessing the air quality and health effects of wild and prescribed fires, continuing to improve the Smoke Sense app (www.epa.gov/air-research/smoke-sense-study-citizen-science-project-using-mobile-app), and evaluating how filtration devices can reduce exposure during smoke episodes.

The program has been working on two types of energy projects: (1) household and alternative energy systems and (2) energy efficiency. The program is working on a household-energy project with the Navajo Nation to develop and evaluate a cleaner burning, custom-designed stove that reduces indoor smoke while providing improved heating when coupled with home weatherization. Air and Energy also continues to evaluate emissions from pellet stoves, which can be used to develop ISO standards. The program also is interested in air toxics, including citizen science approaches and measurement methods for PFAS and ethylene oxides, ozone nonattainment and extreme events. TSC members are welcome to provide input about any of the Air and Energy research projects.

Safe and Sustainable Water Resources (SSWR)

Joe Williams explained that SSWR is committed to research and scientific analyses to support and develop solutions that ensure adequate supplies of clean water to protect people's health and livelihood, protect and restore watersheds and aquatic ecosystems, and strengthen the U.S. economy. The program is performing microbial source tracking work under the Human Health Criteria and Aquatic Life Criteria within the overarching topic of watersheds. Critical tools are being developed, and data are being collected to address microbial contamination and protect environmental and human health. Under the

overarching topics of nutrients and HABs, EPA has developed the CyAN mobile app for Android devices and is in the process of linking it to a web-based platform so that the content will be more widely available before the 2021 summer recreational season.

Another project is focused on reducing lead and copper in water distribution systems, which was identified as a priority during the Tribal Consultation held in November and December 2019. The research program is making progress toward this project and hopes to have more information available by July 2021. Chris Impellitteri added that a major focus of this work is developing lead sampling strategies and helping utilities and municipalities identify where lead service lines are located. The program is working with U.S. and Canadian organizations to develop sampling schemes that allow confidence in identifying the locations of these lead pipes.

Joe explained that EPA's Water Research website (www.epa.gov/water-research) includes relevant tools and information about two webinar series, the Water Research Webinar Series and the Small Systems Monthly Webinar Series. Throughout 2020, 164 tribal members representing 64 tribes attended these webinars. A good deal of information and training was provided about solutions and strategies to small drinking water systems during the 17th Annual EPA Drinking Water Workshop: Small System Challenges and Solutions (www.epa.gov/water-research/17th-annual-epa-drinking-water-workshop-small-system-challenges-and-solutions); 48 tribal members representing 34 tribes attended the workshop. SSWR is planning a webinar focused on tribal water systems for 2021 and working to roll out an online technical support request form. Michelle Latham added July 27th Small Systems Webinar is being focused on Tribal Community Water Systems. It was also noted the SSWR research program is soliciting additional suggestions for topics that tribes would like to hear about.

Sustainable and Healthy Communities (SHC)

Andrew Geller thanked the tribal members for their input during the StRAP development process and hopes that tribes see these tribal science priorities reflected in SHC's ongoing work. The program emphasizes research and technology to clean up contaminated sites and protect communities associated with these sites while also restoring ecosystems that provide benefits to communities. The research portfolio delivers science-based solutions in three main topic areas: (1) contaminated sites, (2) waste and materials management, and (3) healthy and resilient communities. Research focuses on vulnerable groups and life stages, PFAS, and lead.

Andrew touched on activities related to technical support and mining-related contamination. ORD has worked with federal, state and tribal partners to remediate the extremely complex Tar Creek Superfund megasite near the Quapaw Nation, as Craig had mentioned, and a mining site near Lake Koocanusa, which Mike mentioned. ORD technical support centers have helped Tar Creek stakeholders to evaluate the effects of land-management practices on water and sediments to guide further remediation decisions. The goal is to develop a decision-support watershed model to assist with multisite cleanup. Lake Koocanusa and the Kootenay River have a transboundary selenium water-quality issue originating from drainage from a coal mine in Canada. Regions 8 and 10 asked ORD to review a proposed innovative passive treatment technology to treat selenium in the area. These regions are working with federal, state and tribal agencies on this effort, with much of the work coordinated through OITA. ORD also works on geochemical analyses to better support connectivity between the upper Animas River headwaters and downstream waters, as well as technologies, sampling methods and exposure models, to help with mining cleanup. Abandoned mine data and attributes are being added to EnviroAtlas (www.epa.gov/enviroatlas), which includes tribal boundaries.

Research linking site remediation and ecological restoration supports SHC's larger efforts to place cleanups in the context of its Remediation-to-Restoration-to-Revitalization (R2R2R) process. R2R2R moves beyond cleanup to setting criteria for robust ecological restoration of heritage ecosystems. This work is being performed in the Great Lakes, including on Spirit Lake in Minnesota. SHC also focuses on

underground storage tank (UST) research and recently released the UST Finder (www.epa.gov/ust/ust-finder) web map application. To complement this work, SHC is developing a ground water vulnerability model and geophysical ground water mapping tools.

To address vulnerable life stages and because children's exposures in licensed tribal daycare centers are not well characterized, SHC has been performing research—in collaboration with Region 10 and the Portland Area Indian Health Services—on environmental conditions at 31 tribal daycare centers. Preliminary results include data on pesticides, polychlorinated biphenyls (PCBs), lead and allergens. At least one pesticide was present at each daycare center; no PCBs were present. When complete, the results will be compared to data from a national daycare center study conducted in 2001 to determine where disparities exist and whether best practices have reduced exposures. SHC is looking for other federally recognized tribes that would be interested in this research being carried out in their daycare centers.

Homeland Security

Shawn Ryan explained that the two aims of the Homeland Security Research Program are to (1) advance EPA's capabilities—as well as those of its state, tribal and local partners—to respond to and recover from wide-area contamination incidents and (2) improve the abilities of water utilities to prevent or manage water contamination incidents. The research program focuses on resilience to environmental catastrophes that threaten public health and welfare. To develop its areas of research focus, the program identifies needs and groups them according to similarity in decision-making. Interconnections among the needs and research areas are clarified, and research areas are organized within research topics. Research areas include contaminant characterization and consequence assessment, environmental cleanup and infrastructure remediation, and system approaches to preparedness and response.

Significant recent research and products related to water treatment and infrastructure decontamination include the evaluation of various pluming materials and water quality parameters on the occurrence and persistence of *Legionella pneumophila* and development of the *Water-on-Wheels (WOW) Emergency Water Treatment Cart—User Manual*. The WOW mobile water treatment unit can provide potable water and treat contaminated water.

After wide-area incidents, it is difficult to make decisions to properly manage the large amounts of generated waste and debris. To better understand and predict these waste management issues, the program is developing a suite of tools and resources for planning and response/recovery purposes, including two newly developed GIS-based tools. The Waste Staging and Storage Site Selection Tool uses geospatial information and analysis techniques to help identify and prioritize potential locations for staging and storing waste. The All Hazards Waste Logistics Tool calculates the cost and time to manage the transportation and handling of waste and allows users to run their own routing scenarios.

The Environmental Resilience Tools Wizard supports systems-based decision-making and addresses air quality, water quality, environmental justice, ecosystems, waste and other environmental topics as related to disaster resilience. This tool provides information on EPA's resilience resources and how and when decision-makers can apply them.

In fiscal year (FY) 2021, the program will focus on remediation of fentanyl-contaminated indoor environments, a sampling and analysis procedure for fentanyl and its analogues in environmental matrices of concern, and an update to the 2009 sensors handbook for water security (*Distribution System Water Quality Monitoring: Sensor Technology Evaluation Methodology and Results—A Guide for Sensor Manufacturers and Water Utilities*).

Health and Environmental Risk Assessment (HERA)

Samantha Jones explained that HERA replaced the Human Health Risk Assessment Research Program, and its vision is to innovate and advance the science and practice of assessments. HERA is structured with

four research areas within two topics. Within the science assessments and translation topic are the science assessment development and science assessment translation research areas. Within the topic of advancing the science and practice of risk assessment are the emerging and innovative assessment methodologies research area and essential assessment and infrastructure tools research area.

Research Area 1. Science assessment development is focused on high-quality, transparent, consistent and scientifically defensible assessment products to meet EPA's diverse statutory and policy needs. Recent products include integrated science assessments (ISAs) for ozone and particulate matter, as well as the first multipollutant ISA for particulate matter and oxides of nitrogen and sulfur. EPA's Integrated Risk Information System (IRIS) addresses potential adverse health effects from exposure to environmental substances, and recent products related to IRIS include systematic review materials for nine chemicals and systematic review protocols that describe the methods that will be used to conduct assessment of some perfluorinated chemicals, methylmercury and PCBs. The program recently has completed traditional Provisional Peer-Reviewed Toxicity Value assessments for several chemicals of concern.

Research Area 2. Science assessment translation focuses on tailored support activities, modules and applications to address the requests for technical support and consultations from program and regional offices, states, and tribes. HERA is building the existing technical support infrastructure of the Superfund Health Risk Technical Support Center by developing tools and approaches that will increase readiness to respond efficiently when needs are identified.

Research Area 3. Emerging and innovative assessment methodologies research focuses on incorporating new and innovative methodologies in predictive toxicology, rapid evidence evaluation, systematic review, and toxicokinetic and dose-response modeling across a landscape of decision contexts and assessment products.

Research Area 4. Essential assessment and infrastructure tools research supports the maintenance and development of new and existing tools and databases used in the assessment process and provides training on such tools and resources to stakeholders. Two tools—Health & Environmental Research Online (HERO; hero.epa.gov/hero) and the Health Assessment Workspace Collaborative (hawcprd.epa.gov)—allow efficient and transparent assessment development, broader sharing of resources, and transparent engagement. Other tools include the All Ages Lead Model and two exposure factors interactive tools, ExpoFIRST and ExpoKids.

Keynote Presentation: Chemical Safety for Sustainability (CSS) Research Program Update and Demonstration of the EPA CompTox Chemicals Dashboard
Jeffrey (Jeff) Frithsen, NPD, Chemical Safety for Sustainability Research Program, ORD, EPA, and Antony (Tony) Williams, Center for Computational Toxicology and Exposure, ORD, EPA

Jeff Frithsen explained that CSS provides methods, data, information and tools to EPA partners and stakeholders, which allows more informed, timely decisions about chemicals, including those that have not been evaluated thoroughly for potential risks to human or ecological health. The program's long-term objectives are to provide the information needed to inform EPA decisions about chemicals; accelerate the pace of chemical assessment and decision-making; replace, reduce and refine vertebrate animal testing; and provide scientific innovation and leadership to transform chemical screening and assessment practices.

Recent accomplishments of the program include development and improvement of the ECOTOX Knowledgebase (cfpub.epa.gov/ecotox), which provides single-chemical environmental toxicity data on aquatic life, terrestrial plants and wildlife; Chemical Transformation Simulator (qed.epacdx.net/cts), a web tool for predicting environmental and biological transformation pathways and physicochemical properties of organic chemicals, including a PFAS reaction library; and Ecological Risk Assessment

Framework, which links population model development with ecological risk assessment objectives to support chemical ecological risk assessment. FY 2021 research will include a focus on new approach methodologies, developmental neurotoxicity, nanomaterials, the Toxic Substances Control Act, PFAS, nontargeted analytic methods, biotechnology/synthetic biology and information delivery.

Tony Williams provided a demonstration of the EPA CompTox Chemicals Dashboard (comptox.epa.gov/dashboard), which has been online for 5 years. Chemistry never stops, so EPA provides incremental releases every 6 months, and the flexible search capabilities continue to expand with each release. The dashboard addresses the needs for consumable data and the critical challenge of providing fast characterization of human and ecological risk posed by existing and emerging chemicals. The dashboard serves as a centralized "first-stop shop" for chemistry, toxicity and exposure information to support EPA and partner decision-making. Providing easy access to these data (i.e., no log-in necessary) improves efficiency and ultimately acerates chemical risk assessment.

CompTox provides access to information about 882,000 chemicals with related property data, experimental and predicted physicochemical property data, and experimental human and ecological hazard data, as well as consumer products containing chemicals. The dashboard integrates biological assay data for thousands of chemicals, links to other agency websites and public data resources, features literature searches for chemicals using public resources, and allows batch searching for thousands of chemicals. The application is being totally rearchitected to develop a public API (application programming interface).

Additional CompTox resources are available online. Almost 200 presentations about the dashboard may be found at tinyurl.com/w5hqs55. Computational Toxicology Community of Practice videos are available at www.epa.gov/chemical-research/computational-toxicology-communities-practice. The dashboard manual can be found at www.epa.gov/chemical-research/comptox-chemicals-dashboard-help. The latest news about CompTox is available at comptox.epa.gov/dashboard/news info.

Tony encouraged the TSC members and guests to contact him at williams.antony@epa.gov if they wished to provide feedback or follow-up with any questions. He is willing to provide live demonstrations for anyone who is interested.

Dianne asked how new EPA tools can address nonchemical stressors and how they influence the hazards portion of a risk assessment. Jeff responded that CSS focuses on chemical stressors, although other ORD research programs focus on nonchemical stressors and may have this information.

Dianne asked whether the dashboard includes the ability to predict toxicity for a combined mixture. Tony replied that researchers can address complex mixtures of known individual chemicals, but because aggregate mixtures include variable concentrations, characterizing these reactions is difficult. The program is examining methods to study complex mixtures, but this area remains challenging.

Breakout Sessions: Tools, Resources and Science Issues—Discussions and Demonstrations

The TSC members and invited guests met in smaller breakout groups to learn about various topics.

- **Considering Susceptible Subpopulations Under TSCA From Children and Tribal Health Perspectives.** *Susan Euling, Office of Children's Health Protection, EPA; Susanna Blair, Special Assistant/Advisor, Office of Pollution Prevention and Toxics, OCSPP, EPA; and Amanda Hauff of EPA's OCSPP*
- **A Demonstration of PFAS Analytic Tools.** *Michael Barrette and Nick Spalt, Office of Enforcement and Compliance Assurance, EPA*
- **EPA Research Supporting the Reduction of Environmental Transmission of COVID-19.** *Shawn Ryan, NPD, Homeland Security Research Program, ORD, EPA*

- **Air Sensors for Wildfire Smoke: PurpleAir, AirNow Fire and Smoke Map.** *Andrea Clements, Karoline (Johnson) Barkjohn and Amara Holder, CEMM, ORD, EPA*

Friday, December 4, 2020
Theme: TSC Business

Caucus Sessions

The Tribal and EPA Caucuses met separately to discuss individual Caucus business.

Caucus Report Outs

Tribal Caucus

Neil reported that the Tribal Caucus had reflected on the meeting thus far and discussed how other EPA-Tribal Partnership Groups operate. The TSC is fortunate to have Tribal Caucus members who also serve on other EPA-Tribal Partnership Groups, which are responsible for educating EPA about tribes and their unique issues. This engagement is important because of the ongoing effort to explain about tribes and who they are. The Tribal Caucus members think it is important that EPA staff read and understand the 1984 Indian Policy. The Tribal Representatives thought that the breakout groups were very successful and having at least one Tribal Caucus member in each group allowed intimate exchange with individual EPA staff to share information. The Tribal Caucus was introduced to the new Region 5 Tribal Representative, Scott Walz.

EPA Caucus

Brenda reported that the EPA Caucus had discussed some of the TSC's recent themes and goals, including bolstering communication and networking, featuring tribal science through the monthly TSC Science Seminars, and having EPA continue to serve as a resource on topics of tribal interest (e.g., PFAS). Recent TSC accomplishments include providing feedback on the lead curriculum and identifying key science needs for tribes for the StRAPs; another round of StRAPs input is on the horizon. The TSC is sponsoring two listening sessions on ORD's Wildland Fire Research Framework in January and February 2021. The EPA Caucus also discussed Indigenous ways of knowing and how to support tribal-EPA collaborations to advance chemical risk evaluations in the United States, as well as how to advance the cooperation of Western and Indigenous science approaches in the United States. During the next year, the TSC will continue to explore Indigenous research frameworks and the systematic literature review of subsistence aquatic biota (seafood) consumption and begin to collect tribal input for ORD StRAP research planning.

TSC Updates

Subsistence Aquatic Biota (Seafood) Consumption Literature Review Pilot

José explained that the literature review effort had evolved organically from TSC work with other EPA-Tribal Partnership Groups, including the work of the National Tribal Toxics Council (NTTC) related to tribal risk to toxics and the new TSCA. Tribes are highly affected by environmental toxicants, and tribal sovereignty and treaty rights are paramount. The NTTC developed a conceptual model of exposure scenarios because of the higher exposure tribal members experience in their natural environments. Tribal partners requested that risk evaluations specifically focus on and consider exposures from fish consumption.

The purposes and goals of the literature review are to characterize subsistence seafood consumption to inform estimates of seafood consumption rates, learn about the systematic review process and inform this specific effort so that the findings are useful to all involved, and outline key terms to best identify useful

publications and data. The effort is related to in-progress ORD work within HERA, which is looking to build access to training modules on the advances in risk assessment and systematic review.

The team meets biweekly for 30 minutes, incorporates all tribal input, works through issues and builds consensus, and leverages tribal and EPA expertise. The team members learn together and support one another to produce useful information for tribes and EPA staff. The team has developed a spreadsheet of search terms, and the EPA librarian developed search strategies for Web of Science and PubMed. The team has found 6,571 hits so far, which have been imported into HERO. The team used DistillerSR software to identify potentially relevant hits and now must develop PECO (population, exposure, comparator, outcome) criteria to determine truly relevant hits.

The team obtained input from several sources to determine the plan for the second phase of the effort. Tribal workgroup participants suggested querying ResearchGate, which may be used more commonly to publish tribal information. Tribal and EPA workgroup participants noted the need to examine "gray" literature sources. EPA management requested that the team provide more briefs to ensure more offices are aware of this effort. HERA staff indicated that contract support with machine learning is needed to review the hits. As a result of this input, the team plans to develop a search strategy for ResearchGate, develop a list of gray sources and an associated research strategy, develop talking points and one-pagers about the effort, and seek funding to support machine learning.

Tribal PFAS Working Group

Page explained that the working group had decided to increase its calls from quarterly to monthly. Shawn Smith from the Washington State Department of Ecology attended the October meeting to discuss PFAS disposal. The state decided that incineration is the best option; exposure risk from incineration is lower compared to encapsulation because PFAS can outlive capsules. The group's November call focused on a PFAS analytic tool. The group is preparing a comment letter to the Washington State Department of Ecology—which is developing a chemical action plan for PFAS—indicating the importance of including tribal lifeways in policies, decisions, and PFAS risk assessment and management.

Indigenous Research Methodologies and Protocols and the Region 9 RTOC Effort

Neil reported that the TSC had presented on this effort to the Region 6, 8 and 9 RTOCs and EPA-Tribal Partnership Groups, including the National Tribal Water Council, Tribal Waste and Response Steering Committee, and The Exchange Network Tribal Governance Group. The TSC also hosted a Birds of a Feather session to discuss the effort at the virtual Tribal Lands and Environment Forum in August and a symposium—"Incorporating Indigenous/Traditional Knowledge and Values in Environmental Management: Strengthening Decision-Making in a Modern World"—at the virtual Society of Environmental Toxicology and Chemistry North America 41st Annual Meeting in November.

When Shasta presented about this effort to Region 9, members expressed a lot of enthusiasm, and the region immediately decided to form a workgroup on the topic.

Tribal Lead Curriculum Next Steps

Monica explained that EPA and its partners announced the tribal lead curriculum—*Lead Awareness in Indian Country: Keeping Our Children Healthy!* —in November after a 3-year process of development. The TSC became involved in this effort during the TSC Fall 2017 Face-to-Face Meeting in Phoenix, Arizona, after OCSPP decided to update the existing, outdated lead curriculum. The TSC and NTTC formed a workgroup to develop the curriculum and held pilots in tribal communities, including the Oneida Nation and Shoshone-Bannock Tribes. The workgroup decided early on that the curriculum needed to have a tribal look and influence.

The curriculum includes four modules: (1) Understanding Lead, (2) Effective Cleaning Techniques, (3) Personal Hygiene and Nutrition, and (4) Hiring Certified Lead Professionals. Each module includes a lesson plan, presentation slides, a worksheet, key messages and "Kids Activity Sheet." It was critical that each tribe could tailor the curriculum to its community, and the end result is highly tailorable.

The TSC will host virtual 2-hour train-the-trainer workshops on January 13 and February 10, 2021. The curriculum workgroup will provide trainings to each RTOC. A packet containing a USB stick with all of the materials is being sent to all federally recognized tribes, along with a letter signed by the NTTC Chair and TSC Tribal Co-Chair that explains the effort. The workgroup also is sending thank-you letters to the more than 200 tribal partners who helped with the project. The idea began in an EPA office, and tribes and tribal partners were able to bring the idea to fruition.

Neil asked whether a timeline exists that shows the effort from idea to fruition. Monica believed that Amanda has one available and will ask her.

Janette Marsh asked whether agendas had been developed for the train-the-trainer workshops. Monica indicated that they had not been.

EPA-Tribal Environmental Plan (ETEP) Database

Lon provided information about the database that he developed to track environmental issues identified in ETEPs. ETEPs, developed jointly by tribes and EPA, outline how each tribe and EPA will work together to support the tribe's environmental goals in the context of EPA tribal programs. They serve as a planning and communication tool and provide a roadmap for future decision-making.

Lon needed to identify environmental issues in the "Programs and Priorities" section of ETEPs to determine how the Region 10 Science Division might support tribes in addressing environmental issues and develop collaborations with other Region 10 divisions to address environmental issues identified in ETEPs. To address this need, Lon developed a web-based, relational Microsoft Access database with multi-user access. In addition to storing the original ETEP as a PDF file, the database stores a document describing how the issues, goals and needs were extracted from the original ETEP. The database also allows individuals within a division to search for keywords and provide comments on issues. A wide range of reports can be activated by "the push of a button."

Lon highlighted a sample report identifying issues related to freon, a significant problem in Alaska Native villages. Region 10 is using the ETEP information to address environmental issues of specific concern to tribes in the region, such as HABs and toxins, PFAS, and Alaska sewage lagoon and dump exposures. The next steps are to use the database to identify potential ORD research collaborations, plan and implement database improvements and modifications, discuss data management with other tribes and entities, and discuss other issues of concern (e.g., confidentiality).

Neil asked how tribes submit information. Lon responded that each region has a different process. Region 10's template includes questions about background information, tribal priorities and how EPA can help the tribe. He believes that ETEPs can be more useful than they are at present, and EPA responses often are boilerplate. These plans present a real opportunity to help tribes where the "rubber meets the road." Shasta added that Region 9 does not have a template, and tribes spend a great deal of time trying to determine how to complete the plans, which often are not useful. Instead, the plans are resource and time intensive and offer no benefit. Janette noted that Region 5 uses a spreadsheet template and is hopeful that tribes will use the ETEPs as their work plans for their grants. Region 5 also is establishing a Microsoft Teams channel for each of the 35 Region 5 tribes to disseminate information and share important documents.

Lon, Shasta and José thought that establishing a national database of tribal environmental issues would be useful.

TSC Business

Monica provided an overview of the organizational overview document, particularly the sections related to the Co-Chairs and member participation. The plan is for the TSC to review the document in 2021, which was last updated in June 2017 at the TSC Spring 2017 Face-to-Face Meeting in Rapid City, South Dakota. Monica plans to develop a "TSC 101" orientation guide for new members.

Closing Remarks and Blessing

Neil noted that the TSC members and guests had banked up the embers on Tuesday, and now they disperse the embers until they meet again. He provided the closing blessing in the Tuscarora language and closed the meeting at 4:53 p.m.

National EPA-Tribal Science Council (TSC) Fall 2020 Meeting Participants

TSC Members

Neil Patterson
TSC Tribal Co-Chair
Tuscarora Nation (Region 2)

Page Hingst
TSC Tribal Vice Chair
Santee Sioux Nation of Nebraska (Region 7)

Brenda Rashleigh
TSC Agency Co-Chair
U.S. Environmental Protection Agency
Office of Research and Development

Monia Ben-Khaled
U.S. Environmental Protection Agency
Region 8

Justin Bleiler
U.S. Environmental Protection Agency
Region 8

David Charters
U.S. Environmental Protection Agency
Office of Land and Emergency Management

Ted Coopwood
U.S. Environmental Protection Agency
Office of Children's Health Protection

Shasta Gaughen
Pala Band of Mission Indians (Region 9)

Kate Graf
U.S. Environmental Protection Agency
Office of Water

Karen Hamernik
U.S. Environmental Protection Agency
Office of Chemical Safety and Pollution Prevention

Amanda Hauff
U.S. Environmental Protection Agency
Office of Chemical Safety and Pollution Prevention

Danielle Huang
U.S. Environmental Protection Agency
Region 9

Elizabeth (Beth) Jackson
U.S. Environmental Protection Agency
Office of Environmental Information

Amanda Kaufman
U.S. Environmental Protection Agency
Office of Air and Radiation

Lon Kissinger
U.S. Environmental Protection Agency
Region 10

Craig Kreman
Quapaw Nation (Region 6)

William (Billy) Longfellow
Passamaquoddy Tribe at Sipayik (Region 1)

Janette Marsh
U.S. Environmental Protection Agency
Region 5

Mari Nord
U.S. Environmental Protection Agency
Region 5

Alexandra (Alexa) Olson
U.S. Environmental Protection Agency
Region 6

Regina Poeske
U.S. Environmental Protection Agency
Region 3

Francine St. Denis
U.S. Environmental Protection Agency
Office of International and Tribal Affairs
American Indian Environmental Office

Kai Tang
U.S. Environmental Protection Agency
Region 2

Christopher (Chris) Taylor
U.S. Environmental Protection Agency
Region 7

Dawn Taylor
U.S. Environmental Protection Agency
Region 4

Katie Tiger
Eastern Band of Cherokee Indians (Region 4)

Joshua Tweeton
Spirit Lake Tribe (Region 8)

Allyson Two Bears
Standing Rock Sioux Tribe (Region 8)

Scott Walz
Shakopee Mdewakanton Sioux Community (Region 5)

José Zambrana
U.S. Environmental Protection Agency
Office of Research and Development

TSC Support Staff

Monica Rodia
TSC Executive Secretary
U.S. Environmental Protection Agency
Office of Research and Development
Office of Science Advisor, Policy and Engagement

Harichandana (Hari) Karne
U.S. Environmental Protection Agency
Office of Research and Development
Office of Science Advisor, Policy and Engagement

Speakers and Invited Guests

Everett Bandy
Quapaw Nation

Don Barnes
Yurok Tribe

Michael Barrette
U.S. Environmental Protection Agency
Office of Enforcement and Compliance Assurance

Karoline (Johnson) Barkjohn
U.S. Environmental Protection Agency
Office of Research and Development

Alisha Bartling
Santee Sioux Nation of Nebraska

Dianne Barton
National Tribal Toxics Council
Columbia River Inter-Tribal Fish Commission

Heidi Bethel
U.S. Environmental Protection Agency
Office of Water

Susanna Blair
U.S. Environmental Protection Agency
Office of Chemical Safety and Pollution Prevention

Valerie Blank
U.S. Environmental Protection Agency
Office of Research and Development
Office of Science Advisor, Policy and Engagement

Andy Byrne
U.S. Environmental Protection Agency
Office of International and Tribal Affairs
American Indian Environmental Office

Whisper Camel-Means
Confederated Salish and Kootenai Tribes

Jennifer Cashdollar
U.S. Environmental Protection Agency
Office of Research and Development

Andrea Clements
U.S. Environmental Protection Agency
Office of Research and Development

Jasmine Courville-Brown
Tribal Pesticide Program Council
Confederated Salish and Kootenai Tribes

Elizabeth Borneman
Sitka Tribe of Alaska

Kacee Deener
U.S. Environmental Protection Agency
Office of Research and Development
Office of Science Advisor, Policy and Engagement

Michael (Mike) Durglo, Jr.
Keynote Speaker
Confederated Salish and Kootenai Tribes

Kori Ellien
Yurok Tribe

Tabitha Espinoza
Confederated Salish and Kootenai Tribes

Susan Euling
U.S. Environmental Protection Agency
Office of Children's Health Protection

Suzanne Fluharty
National Tribal Toxics Council
Yurok Tribe

Jeffrey (Jeff) Frithsen
Keynote Speaker
U.S. Environmental Protection Agency
Office of Research and Development

Andrew Geller
U.S. Environmental Protection Agency
Office of Research and Development

Kassandra Grimm
Yurok Tribe

Karen Gude
U.S. Environmental Protection Agency
Office of International and Tribal Affairs
American Indian Environmental Office

Amara Holder
U.S. Environmental Protection Agency
Office of Research and Development

Bryan Hubbell
U.S. Environmental Protection Agency
Office of Research and Development

Christopher Impellitteri
U.S. Environmental Protection Agency
Office of Research and Development

Samantha Jones
U.S. Environmental Protection Agency
Office of Research and Development

Mark Junker
National Tribal Water Council
Sac and Fox Nation of Missouri

Jolene Keplin
National Tribal Toxics Council
Turtle Mountain Band of Chippewa Indians

Robin Kimmerer
Center for Native Peoples and the Environment
State University of New York College of Environmental Science and Forestry

Catherine Landis
Center for Native Peoples and the Environment
State University of New York College of Environmental Science and Forestry

Michelle Latham
U.S. Environmental Protection Agency
Office of Research and Development

Shaun Livermore
Poarch Band of Creek Indians

Lisa Matthews
U.S. Environmental Protection Agency
Office of Research and Development

Nettie McMiller
U.S. Environmental Protection Agency
Office of Water

Beth Owens
U.S. Environmental Protection Agency
Office of Research and Development

René Rickard
National Tribal Water Council
Tuscarora Nation/Haudenosaunee Environmental Task Force

Danielle Ridley
U.S. Environmental Protection Agency
Office of Research and Development
Office of Science Advisor, Policy and Engagement

Bruce Rodan
U.S. Environmental Protection Agency
Office of Research and Development

Mary Ross
U.S. Environmental Protection Agency
Office of Research and Development
Office of Science Advisor, Policy and Engagement

Shawn Ryan
U.S. Environmental Protection Agency
Office of Research and Development

Angie Shatas
U.S. Environmental Protection Agency
Office of Air and Radiation

Michael Slimak
U.S. Environmental Protection Agency
Office of Research and Development

Nick Spalt
U.S. Environmental Protection Agency
Office of Enforcement and Compliance Assurance

Laurie Suter
National Tribal Toxics Council
Tohono O'odham Nation

Geneva E.B. Thompson
Keynote Speaker
Office of the Tribal Attorney, Yurok Tribe
Citizen, Cherokee Nation

Taylor Thompson
Yurok Tribe

Emily Trentacoste
U.S. Environmental Protection Agency
Region 3 Chesapeake Bay Program Office

Tim Watkins
U.S. Environmental Protection Agency
Office of Research and Development

Antony (Tony) Williams
Keynote Speaker
U.S. Environmental Protection Agency
Office of Research and Development

Joe Williams
U.S. Environmental Protection Agency
Office of Research and Development

Ann Wyatt
National Tribal Water Council
Klawock Cooperative Association

Contractor Support

John Hare
The Scientific Consulting Group, Inc.

Kristen LeBaron
The Scientific Consulting Group, Inc.

Rachel Pisarski
The Scientific Consulting Group, Inc.

Wensday Worth
The Scientific Consulting Group, Inc.